

SEQUENCE LISTING

<110> THE GOVERNMENT OF THE UNITED STATES OF AMERICA AS
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 HUMAN SERVICES, CENTERS FOR DISEASE CONTROL AND PREVENTION
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 Owen, Sherry M.

<120> IMMUNOGENIC HIV-1 MULTI-CLADE, MULTIVALENT CONSTRUCTS AND METHODS
 OF THEIR USE

<130> 6395-67675

<150> US 60/458,880

<151> 2003-03-28

<160> 64

<170> PatentIn version 3.2

<210> 1

<211> 1557

<212> DNA

<213> Artificial Sequence

<220>

<223> Construct encoding polyepitope polypeptide.

<220>

<221> CDS

<222> (12)..(1547)

<223> Sequence encoding MCMVCTL-ubiquitin polyepitope polypeptide.

<400> 1

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acc ctt gag gtg gag ccc agt gac acc atc gaa aat gtg aag gcc aag	98
Thr Leu Glu Val Glu Pro Ser Asp Thr Ile Glu Asn Val Lys Ala Lys	
15 20 25	
atc cag gat aag gaa ggc att ccc ccc gac cag cag agg ctc atc ttt	146
Ile Gln Asp Lys Glu Gly Ile Pro Pro Asp Gln Gln Arg Leu Ile Phe	
30 35 40 45	
gca ggc aag cag ctg gaa gat ggc cgt act ctt tct gac tac aac atc	194
Ala Gly Lys Gln Leu Glu Asp Gly Arg Thr Leu Ser Asp Tyr Asn Ile	
50 55 60	
cag aag gag tcg acc ctg cac ctg gtc ctg cgt ctg aga ggt gct gag	242
Gln Lys Glu Ser Thr Leu His Leu Val Leu Arg Leu Arg Gly Ala Glu	
65 70 75	
ctc cgc tcc ctc tac aac acc gtg gcc acc ctc tac tgc gtg cac cag	290
Leu Arg Ser Leu Tyr Asn Thr Val Ala Thr Leu Tyr Cys Val His Gln	
80 85 90	
cgc atc aag atc cgc ctg cgc ccc ggc ggc aag aag aag tac tgg gcc	338
Arg Ile Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Trp Ala	

95	100	105	
agc cgc gag ctg gag cgc ttc aag gcc gcc atc agc ccc cgc acc ctg Ser Arg Glu Leu Glu Arg Phe Lys Ala Ala Ile Ser Pro Arg Thr Leu 110 115 120 125			386
aac gcc tgg gtg aag gtg gtg aag gcc ttc agc ccc gag gtg atc ccc Asn Ala Trp Val Lys Val Val Lys Ala Phe Ser Pro Glu Val Ile Pro 130 135 140			434
atg ttc agc gcc ctg agc gag ggc gcc acc ccc cag gac ctg aac acc Met Phe Ser Ala Leu Ser Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr 145 150 155			482
atg acc agc acc ctg cag gag cag atc ggc tgg aag gcc gcc aac ccc Met Thr Ser Thr Leu Gln Glu Gln Ile Gly Trp Lys Ala Ala Asn Pro 160 165 170			530
ccc atc ccc gtg ggc gac atc tac aag cgc tgg atc atc ctg ggc ctg Pro Ile Pro Val Gly Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu 175 180 185			578
aac aag atc gtg cgc atg tac agc ccc acc agc atc ttc cgc gac tac Asn Lys Ile Val Arg Met Tyr Ser Pro Thr Ser Ile Phe Arg Asp Tyr 190 195 200 205			626
gtg gac cgc ttc tac aag acc ctg cgc gcc gtg cag aac gcc aac ccc Val Asp Arg Phe Tyr Lys Thr Leu Arg Ala Val Gln Asn Ala Asn Pro 210 215 220			674
gac tgc aag acc atc ctg aag gcc ctg gcc tgc cag ggc gtg ggc ggc Asp Cys Lys Thr Ile Leu Lys Ala Leu Ala Cys Gln Gly Val Gly Gly 225 230 235			722
ccc ggc cac aag aag gcc gcc atc acc ctg tgg cag cgc ccc ctg gtg Pro Gly His Lys Lys Ala Ala Ile Thr Leu Trp Gln Arg Pro Leu Val 240 245 250			770
acc gtg ctg gac gtg ggc gac gcc tac ttc agc gtg tgg aag ggc agc Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser Val Trp Lys Gly Ser 255 260 265			818
ccc gcc atc ttc cag agc aag ctt cgc ggc ccc ggc cgc gcc ttc gtg Pro Ala Ile Phe Gln Ser Lys Leu Arg Gly Pro Gly Arg Ala Phe Val 270 275 280 285			866
acc atc aag gcc gcc gcc tgc acc ccc tac gac atc aac cag atg ctg Thr Ile Lys Ala Ala Ala Cys Thr Pro Tyr Asp Ile Asn Gln Met Leu 290 295 300			914
ggt acc agc atg acc aag atc ctg aag gag ccc gtg cac ggc gtg aag Gly Thr Ser Met Thr Lys Ile Leu Lys Glu Pro Val His Gly Val Lys 305 310 315			962
gcc gcc cag atc tac cag gag ccc ttc aag aac ctg aag acc ggc gag Ala Ala Gln Ile Tyr Gln Glu Pro Phe Lys Asn Leu Lys Thr Gly Glu 320 325 330			1010
ccc atc gtg ggc gcc gag acc ttc tac gtg gac ggc gcc gcc aac gtg Pro Ile Val Gly Ala Glu Thr Phe Tyr Val Asp Gly Ala Ala Asn Val 335 340 345			1058

atc tac cag tac atg gac gac ctg ctg ctg tgg aag ggc gag ggc gcc 1106
 Ile Tyr Gln Tyr Met Asp Asp Leu Leu Leu Trp Lys Gly Glu Gly Ala
 350 355 360 365

gtg aag gcc gcc cgc atc cgc acc tgg aag agc ctg gtg aag cac ccc 1154
 Val Lys Ala Ala Arg Ile Arg Thr Trp Lys Ser Leu Val Lys His Pro
 370 375 380

aag gtg agc agc gag gtg cac atc gcc gtg cgc cac ttc ccc cgc atc 1202
 Lys Val Ser Ser Glu Val His Ile Ala Val Arg His Phe Pro Arg Ile
 385 390 395

tgg gcc gtg cgc cac ttc ccc cgc ccc tgg gcc atc atc cgc atc ctg 1250
 Trp Ala Val Arg His Phe Pro Arg Pro Trp Ala Ile Ile Arg Ile Leu
 400 405 410

cag cag ctg aag gcc gcc gtg ggc ttc ccc gtg cgc ccc cag gtg ccc 1298
 Gln Gln Leu Lys Ala Ala Val Gly Phe Pro Val Arg Pro Gln Val Pro
 415 420 425

ctg cgc ccc atg acc tac aag ggc gcc gtg gac ctg agc cac ttc ctg 1346
 Leu Arg Pro Met Thr Tyr Lys Gly Ala Val Asp Leu Ser His Phe Leu
 430 435 440 445

aag gag aag ggc ggc ctg ggc ccc ggc gtg cgc tac ccc ctg acc ttc 1394
 Lys Glu Lys Gly Gly Leu Gly Pro Gly Val Arg Tyr Pro Leu Thr Phe
 450 455 460

ggc tgg tgc tac aag gcc gcc aag acc ctg ccc ctg tgc gtg acc ctg 1442
 Gly Trp Cys Tyr Lys Ala Ala Lys Thr Leu Pro Leu Cys Val Thr Leu
 465 470 475

acc gtg tac tac ggc gtg ccc gtg tgg aag gag gcc acc acc acc ctg 1490
 Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr Thr Thr Leu
 480 485 490

cgc gcc atc gag gcc cag cag cac ctg gag cgc tac ctg aag gac ggc 1538
 Arg Ala Ile Glu Ala Gln Gln His Leu Glu Arg Tyr Leu Lys Asp Gly
 495 500 505

ggc ctg tag ctcgagtagc 1557
 Gly Leu
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 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Construct encoding polyepitope polypeptide.

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 1 5 10 15

Val Glu Pro Ser Asp Thr Ile Glu Asn Val Lys Ala Lys Ile Gln Asp

20	25	30
Lys Glu Gly Ile Pro Pro Asp Gln Gln Arg Leu Ile Phe Ala Gly Lys		
35	40	45
Gln Leu Glu Asp Gly Arg Thr Leu Ser Asp Tyr Asn Ile Gln Lys Glu		
50	55	60
Ser Thr Leu His Leu Val Leu Arg Leu Arg Gly Ala Glu Leu Arg Ser		
65	70	75
Leu Tyr Asn Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Lys		
85	90	95
Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Trp Ala Ser Arg Glu		
100	105	110
Leu Glu Arg Phe Lys Ala Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp		
115	120	125
Val Lys Val Val Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser		
130	135	140
Ala Leu Ser Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Thr Ser		
145	150	155
Thr Leu Gln Glu Gln Ile Gly Trp Lys Ala Ala Asn Pro Pro Ile Pro		
165	170	175
Val Gly Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile		
180	185	190
Val Arg Met Tyr Ser Pro Thr Ser Ile Phe Arg Asp Tyr Val Asp Arg		
195	200	205
Phe Tyr Lys Thr Leu Arg Ala Val Gln Asn Ala Asn Pro Asp Cys Lys		
210	215	220
Thr Ile Leu Lys Ala Leu Ala Cys Gln Gly Val Gly Gly Pro Gly His		
225	230	235
Lys Lys Ala Ala Ile Thr Leu Trp Gln Arg Pro Leu Val Thr Val Leu		
245	250	255
Asp Val Gly Asp Ala Tyr Phe Ser Val Trp Lys Gly Ser Pro Ala Ile		
260	265	270

Phe Gln Ser Lys Leu Arg Gly Pro Gly Arg Ala Phe Val Thr Ile Lys
 275 280 285

Ala Ala Ala Cys Thr Pro Tyr Asp Ile Asn Gln Met Leu Gly Thr Ser
 290 295 300

Met Thr Lys Ile Leu Lys Glu Pro Val His Gly Val Lys Ala Ala Gln
 305 310 315 320

Ile Tyr Gln Glu Pro Phe Lys Asn Leu Lys Thr Gly Glu Pro Ile Val
 325 330 335

Gly Ala Glu Thr Phe Tyr Val Asp Gly Ala Ala Asn Val Ile Tyr Gln
 340 345 350

Tyr Met Asp Asp Leu Leu Leu Trp Lys Gly Glu Gly Ala Val Lys Ala
 355 360 365

Ala Arg Ile Arg Thr Trp Lys Ser Leu Val Lys His Pro Lys Val Ser
 370 375 380

Ser Glu Val His Ile Ala Val Arg His Phe Pro Arg Ile Trp Ala Val
 385 390 395 400

Arg His Phe Pro Arg Pro Trp Ala Ile Ile Arg Ile Leu Gln Gln Leu
 405 410 415

Lys Ala Ala Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro
 420 425 430

Met Thr Tyr Lys Gly Ala Val Asp Leu Ser His Phe Leu Lys Glu Lys
 435 440 445

Gly Gly Leu Gly Pro Gly Val Arg Tyr Pro Leu Thr Phe Gly Trp Cys
 450 455 460

Tyr Lys Ala Ala Lys Thr Leu Pro Leu Cys Val Thr Leu Thr Val Tyr
 465 470 475 480

Tyr Gly Val Pro Val Trp Lys Glu Ala Thr Thr Thr Leu Arg Ala Ile
 485 490 495

Glu Ala Gln Gln His Leu Glu Arg Tyr Leu Lys Asp Gly Gly Leu
 500 505 510

<210> 3
 <211> 1323
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Construct encoding polyepitope polypeptide.

 <220>
 <221> CDS
 <222> (7)..(1317)
 <223> Sequence encoding MCMVCTL (no ubiquitin) polyepitope polypeptide.

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 1 5 10

 tgc gtg cac cag cgc atc aag atc cgc ctg cgc ccc gcc gcc aag aag 96
 Cys Val His Gln Arg Ile Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys
 15 20 25 30

 aag tac tgg gcc agc cgc gag ctg gag cgc ttc aag gcc gcc atc agc 144
 Lys Tyr Trp Ala Ser Arg Glu Leu Glu Arg Phe Lys Ala Ala Ile Ser
 35 40 45

 ccc cgc acc ctg aac gcc tgg gtg aag gtg gtg aag gcc ttc agc ccc 192
 Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Lys Ala Phe Ser Pro
 50 55 60

 gag gtg atc ccc atg ttc agc gcc ctg agc gag gcc gcc acc ccc cag 240
 Glu Val Ile Pro Met Phe Ser Ala Leu Ser Glu Gly Ala Thr Pro Gln
 65 70 75

 gac ctg aac acc atg acc agc acc ctg cag gag cag atc gcc tgg aag 288
 Asp Leu Asn Thr Met Thr Ser Thr Leu Gln Glu Gln Ile Gly Trp Lys
 80 85 90

 gcc gcc aac ccc ccc atc ccc gtg gcc gac atc tac aag cgc tgg atc 336
 Ala Ala Asn Pro Pro Ile Pro Val Gly Asp Ile Tyr Lys Arg Trp Ile
 95 100 105 110

 atc ctg gcc ctg aac aag atc gtg cgc atg tac agc ccc acc agc atc 384
 Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr Ser Pro Thr Ser Ile
 115 120 125

 ttc cgc gac tac gtg gac cgc ttc tac aag acc ctg cgc gcc gtg cag 432
 Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Thr Leu Arg Ala Val Gln
 130 135 140

 aac gcc aac ccc gac tgc aag acc atc ctg aag gcc ctg gcc tgc cag 480
 Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala Leu Ala Cys Gln
 145 150 155

 gcc gtg gcc gcc ccc gcc cac aag aag gcc gcc atc acc ctg tgg cag 528
 Gly Val Gly Gly Pro Gly His Lys Lys Ala Ala Ile Thr Leu Trp Gln
 160 165 170

 cgc ccc ctg gtg acc gtg ctg gac gtg gcc gac gcc tac ttc agc gtg 576

Arg	Pro	Leu	Val	Thr	Val	Leu	Asp	Val	Gly	Asp	Ala	Tyr	Phe	Ser	Val			
175					180					185					190			
tgg	aag	ggc	agc	ccc	gcc	atc	ttc	cag	agc	aag	ctt	cgc	ggc	ccc	ggc			624
Trp	Lys	Gly	Ser	Pro	Ala	Ile	Phe	Gln	Ser	Lys	Leu	Arg	Gly	Pro	Gly			
				195					200					205				
cgc	gcc	ttc	gtg	acc	atc	aag	gcc	gcc	gcc	tgc	acc	ccc	tac	gac	atc			672
Arg	Ala	Phe	Val	Thr	Ile	Lys	Ala	Ala	Ala	Cys	Thr	Pro	Tyr	Asp	Ile			
			210					215					220					
aac	cag	atg	ctg	ggt	acc	agc	atg	acc	aag	atc	ctg	aag	gag	ccc	gtg			720
Asn	Gln	Met	Leu	Gly	Thr	Ser	Met	Thr	Lys	Ile	Leu	Lys	Glu	Pro	Val			
		225					230						235					
cac	ggc	gtg	aag	gcc	gcc	cag	atc	tac	cag	gag	ccc	ttc	aag	aac	ctg			768
His	Gly	Val	Lys	Ala	Ala	Gln	Ile	Tyr	Gln	Glu	Pro	Phe	Lys	Asn	Leu			
		240				245					250							
aag	acc	ggc	gag	ccc	atc	gtg	ggc	gcc	gag	acc	ttc	tac	gtg	gac	ggc			816
Lys	Thr	Gly	Glu	Pro	Ile	Val	Gly	Ala	Glu	Thr	Phe	Tyr	Val	Asp	Gly			
255					260					265				270				
gcc	gcc	aac	gtg	atc	tac	cag	tac	atg	gac	gac	ctg	ctg	ctg	tgg	aag			864
Ala	Ala	Asn	Val	Ile	Tyr	Gln	Tyr	Met	Asp	Asp	Leu	Leu	Leu	Trp	Lys			
			275						280					285				
ggc	gag	ggc	gcc	gtg	aag	gcc	gcc	cgc	atc	cgc	acc	tgg	aag	agc	ctg			912
Gly	Glu	Gly	Ala	Val	Lys	Ala	Ala	Arg	Ile	Arg	Thr	Trp	Lys	Ser	Leu			
			290					295					300					
gtg	aag	cac	ccc	aag	gtg	agc	agc	gag	gtg	cac	atc	gcc	gtg	cgc	cac			960
Val	Lys	His	Pro	Lys	Val	Ser	Ser	Glu	Val	His	Ile	Ala	Val	Arg	His			
		305					310					315						
ttc	ccc	cgc	atc	tgg	gcc	gtg	cgc	cac	ttc	ccc	cgc	ccc	tgg	gcc	atc			1008
Phe	Pro	Arg	Ile	Trp	Ala	Val	Arg	His	Phe	Pro	Arg	Pro	Trp	Ala	Ile			
		320				325					330							
atc	cgc	atc	ctg	cag	cag	ctg	aag	gcc	gcc	gtg	ggc	ttc	ccc	gtg	cgc			1056
Ile	Arg	Ile	Leu	Gln	Gln	Leu	Lys	Ala	Ala	Val	Gly	Phe	Pro	Val	Arg			
335					340					345				350				
ccc	cag	gtg	ccc	ctg	cgc	ccc	atg	acc	tac	aag	ggc	gcc	gtg	gac	ctg			1104
Pro	Gln	Val	Pro	Leu	Arg	Pro	Met	Thr	Tyr	Lys	Gly	Ala	Val	Asp	Leu			
			355						360					365				
agc	cac	ttc	ctg	aag	gag	aag	ggc	ggc	ctg	ggc	ccc	ggc	gtg	cgc	tac			1152
Ser	His	Phe	Leu	Lys	Glu	Lys	Gly	Gly	Leu	Gly	Pro	Gly	Val	Arg	Tyr			
			370				375						380					
ccc	ctg	acc	ttc	ggc	tgg	tgc	tac	aag	gcc	gcc	aag	acc	ctg	ccc	ctg			1200
Pro	Leu	Thr	Phe	Gly	Trp	Cys	Tyr	Lys	Ala	Ala	Lys	Thr	Leu	Pro	Leu			
			385				390						395					
tgc	gtg	acc	ctg	acc	gtg	tac	tac	ggc	gtg	ccc	gtg	tgg	aag	gag	gcc			1248
Cys	Val	Thr	Leu	Thr	Val	Tyr	Tyr	Gly	Val	Pro	Val	Trp	Lys	Glu	Ala			
	400					405					410							
acc	acc	acc	ctg	cgc	gcc	atc	gag	gcc	cag	cag	cac	ctg	gag	cgc	tac			1296
Thr	Thr	Thr	Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Leu	Glu	Arg	Tyr			

415		420		425		430	
ctg aag gac ggc ggc	ctg tag ctcgag						1323
Leu Lys Asp Gly Gly	Leu						
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<210> 4
<211> 436
<212> PRT
<213> Artificial Sequence
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<220>
<223> Construct encoding polypeptide polypeptide.

<400> 4

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His Gln Arg Ile Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr
20 25 30

Trp Ala Ser Arg Glu Leu Glu Arg Phe Lys Ala Ala Ile Ser Pro Arg
35 40 45

Thr Leu Asn Ala Trp Val Lys Val Val Lys Ala Phe Ser Pro Glu Val
50 55 60

Ile Pro Met Phe Ser Ala Leu Ser Glu Gly Ala Thr Pro Gln Asp Leu
65 70 75 80

Asn Thr Met Thr Ser Thr Leu Gln Glu Gln Ile Gly Trp Lys Ala Ala
85 90 95

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Asn Pro Pro Ile Pro Val Gly Asp Ile Tyr Lys Arg Trp Ile Ile Leu
      100                      105                      110

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Gly Leu Asn Lys Ile Val Arg Met Tyr Ser Pro Thr Ser Ile Phe Arg
115 120 125

Asp Tyr Val Asp Arg Phe Tyr Lys Thr Leu Arg Ala Val Gln Asn Ala
130 135 140

Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala Leu Ala Cys Gln Gly Val
145 150 155 160

Gly Gly Pro Gly His Lys Lys Ala Ala Ile Thr Leu Trp Gln Arg Pro
165 170 175

Leu Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser Val Trp Lys
 180 185 190

Gly Ser Pro Ala Ile Phe Gln Ser Lys Leu Arg Gly Pro Gly Arg Ala
 195 200 205

Phe Val Thr Ile Lys Ala Ala Ala Cys Thr Pro Tyr Asp Ile Asn Gln
 210 215 220

Met Leu Gly Thr Ser Met Thr Lys Ile Leu Lys Glu Pro Val His Gly
 225 230 235 240

Val Lys Ala Ala Gln Ile Tyr Gln Glu Pro Phe Lys Asn Leu Lys Thr
 245 250 255

Gly Glu Pro Ile Val Gly Ala Glu Thr Phe Tyr Val Asp Gly Ala Ala
 260 265 270

Asn Val Ile Tyr Gln Tyr Met Asp Asp Leu Leu Leu Trp Lys Gly Glu
 275 280 285

Gly Ala Val Lys Ala Ala Arg Ile Arg Thr Trp Lys Ser Leu Val Lys
 290 295 300

His Pro Lys Val Ser Ser Glu Val His Ile Ala Val Arg His Phe Pro
 305 310 315 320

Arg Ile Trp Ala Val Arg His Phe Pro Arg Pro Trp Ala Ile Ile Arg
 325 330 335

Ile Leu Gln Gln Leu Lys Ala Ala Val Gly Phe Pro Val Arg Pro Gln
 340 345 350

Val Pro Leu Arg Pro Met Thr Tyr Lys Gly Ala Val Asp Leu Ser His
 355 360 365

Phe Leu Lys Glu Lys Gly Gly Leu Gly Pro Gly Val Arg Tyr Pro Leu
 370 375 380

Thr Phe Gly Trp Cys Tyr Lys Ala Ala Lys Thr Leu Pro Leu Cys Val
 385 390 395 400

Thr Leu Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr Thr
 405 410 415

Thr Leu Arg Ala Ile Glu Ala Gln Gln His Leu Glu Arg Tyr Leu Lys

420

425

430

Asp Gly Gly Leu
435

<210> 5

<211> 487

<212> PRT

<213> Artificial Sequence

<220>

<223> Polyepitope polypeptide.

<400> 5

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20 25 30

Lys Glu Gly Ile Pro Pro Asp Gln Gln Arg Leu Ile Phe Ala Gly Lys
35 40 45

Gln Leu Glu Asp Gly Arg Thr Leu Ser Asp Tyr Asn Ile Gln Lys Glu
50 55 60

Ser Thr Leu His Leu Val Leu Arg Leu Arg Gly Ala Glu Leu Arg Ser
65 70 75 80

Leu Tyr Asn Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Lys
85 90 95

Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Trp Ala Ser Arg Glu
100 105 110

Leu Glu Arg Phe Lys Ala Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp
115 120 125

Val Lys Val Val Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser
130 135 140

Ala Leu Ser Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Thr Ser
145 150 155 160

Thr Leu Gln Glu Gln Ile Gly Trp Lys Ala Ala Asn Pro Pro Ile Pro
165 170 175

Val Gly Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile
 180 185 190

Val Arg Met Tyr Ser Pro Thr Ser Ile Phe Arg Asp Tyr Val Asp Arg
 195 200 205

Phe Tyr Lys Thr Leu Arg Ala Val Gln Asn Ala Asn Pro Asp Cys Lys
 210 215 220

Thr Ile Leu Lys Ala Leu Ala Cys Gln Gly Val Gly Gly Pro Gly His
 225 230 235 240

Lys Lys Ala Ala Ile Thr Leu Trp Gln Arg Pro Leu Val Thr Val Leu
 245 250 255

Asp Val Gly Asp Ala Tyr Phe Ser Val Trp Lys Gly Ser Pro Ala Ile
 260 265 270

Phe Gln Ser Lys Leu Gly Thr Ser Met Thr Lys Ile Leu Lys Glu Pro
 275 280 285

Val His Gly Val Lys Ala Ala Gln Ile Tyr Gln Glu Pro Phe Lys Asn
 290 295 300

Leu Lys Thr Gly Glu Pro Ile Val Gly Ala Glu Thr Phe Tyr Val Asp
 305 310 315 320

Gly Ala Ala Asn Val Ile Tyr Gln Tyr Met Asp Asp Leu Leu Leu Trp
 325 330 335

Lys Gly Glu Gly Ala Val Lys Ala Ala Arg Ile Arg Thr Trp Lys Ser
 340 345 350

Leu Val Lys His Pro Lys Val Ser Ser Glu Val His Ile Ala Val Arg
 355 360 365

His Phe Pro Arg Ile Trp Ala Val Arg His Phe Pro Arg Pro Trp Ala
 370 375 380

Ile Ile Arg Ile Leu Gln Gln Leu Lys Ala Ala Val Gly Phe Pro Val
 385 390 395 400

Arg Pro Gln Val Pro Leu Arg Pro Met Thr Tyr Lys Gly Ala Val Asp
 405 410 415

Leu Ser His Phe Leu Lys Glu Lys Gly Gly Leu Gly Pro Gly Val Arg

420							425					430				
Tyr	Pro	Leu	Thr	Phe	Gly	Trp	Cys	Tyr	Lys	Ala	Ala	Lys	Thr	Leu	Pro	
		435					440					445				
Leu	Cys	Val	Thr	Leu	Thr	Val	Tyr	Tyr	Gly	Val	Pro	Val	Trp	Lys	Glu	
	450					455					460					
Ala	Thr	Thr	Thr	Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Leu	Glu	Arg	
465					470					475					480	
Tyr	Leu	Lys	Asp	Gly	Gly	Leu										
485																

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<210> 6
<211> 412
<212> PRT
<213> Artificial Sequence

<220>
<223> Polyepitope polypeptide.

<400> 6
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His Gln Arg Ile Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr
20 25 30

Trp Ala Ser Arg Glu Leu Glu Arg Phe Lys Ala Ala Ile Ser Pro Arg
35 40 45

Thr Leu Asn Ala Trp Val Lys Val Val Lys Ala Phe Ser Pro Glu Val
50 55 60

Ile Pro Met Phe Ser Ala Leu Ser Glu Gly Ala Thr Pro Gln Asp Leu
65 70 75 80

Asn Thr Met Thr Ser Thr Leu Gln Glu Gln Ile Gly Trp Lys Ala Ala
85 90 95

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Asn Pro Pro Ile Pro Val Gly Asp Ile Tyr Lys Arg Trp Ile Ile Leu
      100                      105                      110

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Gly Leu Asn Lys Ile Val Arg Met Tyr Ser Pro Thr Ser Ile Phe Arg
115 120 125

Asp Tyr Val Asp Arg Phe Tyr Lys Thr Leu Arg Ala Val Gln Asn Ala
 130 135 140

Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala Leu Ala Cys Gln Gly Val
 145 150 155 160

Gly Gly Pro Gly His Lys Lys Ala Ala Ile Thr Leu Trp Gln Arg Pro
 165 170 175

Leu Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser Val Trp Lys
 180 185 190

Gly Ser Pro Ala Ile Phe Gln Ser Lys Leu Gly Thr Ser Met Thr Lys
 195 200 205

Ile Leu Lys Glu Pro Val His Gly Val Lys Ala Ala Gln Ile Tyr Gln
 210 215 220

Glu Pro Phe Lys Asn Leu Lys Thr Gly Glu Pro Ile Val Gly Ala Glu
 225 230 235 240

Thr Phe Tyr Val Asp Gly Ala Ala Asn Val Ile Tyr Gln Tyr Met Asp
 245 250 255

Asp Leu Leu Leu Trp Lys Gly Glu Gly Ala Val Lys Ala Ala Arg Ile
 260 265 270

Arg Thr Trp Lys Ser Leu Val Lys His Pro Lys Val Ser Ser Glu Val
 275 280 285

His Ile Ala Val Arg His Phe Pro Arg Ile Trp Ala Val Arg His Phe
 290 295 300

Pro Arg Pro Trp Ala Ile Ile Arg Ile Leu Gln Gln Leu Lys Ala Ala
 305 310 315 320

Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr Tyr
 325 330 335

Lys Gly Ala Val Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly Leu
 340 345 350

Gly Pro Gly Val Arg Tyr Pro Leu Thr Phe Gly Trp Cys Tyr Lys Ala
 355 360 365

Ala Lys Thr Leu Pro Leu Cys Val Thr Leu Thr Val Tyr Tyr Gly Val

370

375

380

Pro Val Trp Lys Glu Ala Thr Thr Thr Leu Arg Ala Ile Glu Ala Gln
 385 390 395 400

Gln His Leu Glu Arg Tyr Leu Lys Asp Gly Gly Leu
 405 410

<210> 7

<211> 2126

<212> DNA

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<223> Construct encoding polyepitope polypeptide.

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<222> (7)..(2118)

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 Ser Gln Lys Glu Gly Leu His Tyr Thr Cys Val Tyr Gly Pro Gly Pro
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ccc tgc aac aag tgc tac tgc aag aag tgc tgc tac cac tgc cag gtg 288
 Pro Cys Asn Lys Cys Tyr Cys Lys Lys Cys Cys Tyr His Cys Gln Val
 80 85 90

tgc ttc ctg aac aat ccc ggc aag cag cgc cgc ggc acc ccc cag agc 336
 Cys Phe Leu Asn Asn Pro Gly Lys Gln Arg Arg Gly Thr Pro Gln Ser
 95 100 105 110

aac aag gac cac cag aac ccc ggc cct gga ccc aac gag cag gac ctg 384
 Asn Lys Asp His Gln Asn Pro Gly Pro Gly Pro Asn Glu Gln Asp Leu
 115 120 125

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 Leu Ala Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe Asp Ile Ser
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Gln	Asp	Ser	Gln	Thr	His	Gln	Val	Ser	Val	Tyr	Tyr	Ala	Ala	Ala	Gln
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Asn	Lys	Cys	Tyr	Cys	Lys	Lys	Cys	Cys	Tyr	His	Cys	Gln	Val	Cys	Phe
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Gly Ala Cys Asn Thr Cys Tyr Cys Lys Lys Cys Ser Tyr His Cys Leu
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Val Cys Phe Gln Thr Gly Pro Gly Pro Arg Gln Arg Arg Ser Ala Pro
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Thr Gly Pro Gly Pro His Glu Arg Ser Tyr Met Phe Ser Asp Leu Glu
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Met Val His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Gly Pro Gly
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Pro Leu Gln Glu Gln Ile Gly Trp Met Thr Asn Asn Pro Pro Ile Pro
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Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile
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Val Arg Met Tyr Ser Pro Thr Ser Ile Leu Asp Ile Arg Gln Gly Pro
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Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Glu Ile Cys
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Thr Glu Met Glu Lys Glu Gly Lys Ile Ser Lys Ile Gly Pro Gly Pro
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Gly Pro Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser Ile Asn Asn
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Glu Ser Pro Ala Ile Phe Gln Ser Ser Met Thr Lys Ile Leu Glu Pro
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Trp Glu Phe Val Asn Thr Pro Pro Leu Val Lys Leu Trp Tyr Gln Lys
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Thr Ala Val Gln Met Ala Val Phe Ile His Asn Phe Lys Arg Gln Lys
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Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Gly Pro Gly
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Pro Gln Leu Leu Phe Ile His Phe Arg Ser Arg Gln Arg Arg Arg Arg
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Tyr Ser Ser Leu Ile Arg Arg Thr Val Arg Ile Ser Ser Ser Ser Arg
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 580 585 590

Pro Gly Pro Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr

595
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 Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg His
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 Ser Gln Lys Glu Gly Leu His Tyr Thr Cys Val Tyr Gly Pro Gly Pro
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 Lys Tyr Lys Val Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile
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Lys Glu Gly Leu His Tyr Thr Cys Val Tyr Gly Pro Gly Pro Pro Cys
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Asn Lys Cys Tyr Cys Lys Lys Cys Cys Tyr His Cys Gln Val Cys Phe
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Leu Asn Asn Pro Gly Lys Gln Arg Arg Gly Thr Pro Gln Ser Asn Lys
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Asp His Gln Asn Pro Gly Pro Gly Pro Asn Glu Gln Asp Leu Leu Ala
 115 120 125

Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe Asp Ile Ser Asn Pro
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Gly Ala Cys Asn Thr Cys Tyr Cys Lys Lys Cys Ser Tyr His Cys Leu
 145 150 155 160

Val Cys Phe Gln Thr Gly Pro Gly Pro Arg Gln Arg Arg Ser Ala Pro
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Pro Ser Ser Glu Asp His Gln Asn Leu Asn Pro Gly Asn Glu Gln Glu
 180 185 190

Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile
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Thr Gly Pro Gly Pro His Glu Arg Ser Tyr Met Phe Ser Asp Leu Glu
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Asn Arg Cys Ile Asn Glu Lys Asp Leu Leu Ala Leu Asp Lys Trp Gln
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Asn Leu Trp Ser Trp Phe Asp Ile Thr Asn Pro Gly Ser Gly Ile Val
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Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
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Leu Asn Pro Gly Gly Pro Gly Pro Trp Met Glu Trp Asp Arg Glu Ile
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 305 310 315 320

Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Ser Arg Pro Gly Gly Thr
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Met Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser Glu
 340 345 350

Gly Ala Thr Pro Gln Asp Leu Pro Ile Val Gln Asn Ile Gln Gly Gln
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Met Val His Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Gly Pro Gly
 370 375 380

Pro Leu Gln Glu Gln Ile Gly Trp Met Thr Asn Asn Pro Pro Ile Pro
 385 390 395 400

Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile
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Val Arg Met Tyr Ser Pro Thr Ser Ile Leu Asp Ile Arg Gln Gly Pro
 420 425 430

Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Glu Ile Cys
 435 440 445

Thr Glu Met Glu Lys Glu Gly Lys Ile Ser Lys Ile Gly Pro Gly Pro
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Gly Pro Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser Ile Asn Asn
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Glu Ser Pro Ala Ile Phe Gln Ser Ser Met Thr Lys Ile Leu Glu Pro
 485 490 495

Trp Glu Phe Val Asn Thr Pro Pro Leu Val Lys Leu Trp Tyr Gln Lys
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Thr Ala Val Gln Met Ala Val Phe Ile His Asn Phe Lys Arg Gln Lys
 515 520 525

Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Gly Pro Gly
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Tyr Ser Ser Leu Ile Arg Arg Thr Val Arg Ile Ser Ser Ser Ser Arg

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<210> 14
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<400> 14

Glu Arg Tyr Leu Lys Asp Gln Gln Leu
1 5

<210> 15
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<220>
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<400> 15

Ile Pro Met Phe Ser Ala Leu Ser Glu Gly Ala Thr Pro Asp Gln Leu
1 5 10 15

<210> 16
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<213> Artificial Sequence

<220>
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<400> 16

Asn Pro Pro Ile Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile
1 5 10 15

<210> 17
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<220>
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<400> 17

Trp Lys Gly Ser Pro Ala Ile Phe Gln Ser Ser Met Thr
 1 5 10

<210> 18

<211> 9

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<213> Artificial Sequence

<220>

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<400> 18

Ala Ile Phe Gln Ser Ser Met Thr Lys
 1 5

<210> 19

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

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<400> 19

Val Gly Phe Pro Val Thr Pro Gln Val Pro Leu Arg Pro Met Thr
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<210> 20

<211> 11

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<400> 20

Arg Ile Arg Thr Thr Trp Lys Ser Leu Val Lys
 1 5 10

<210> 21

<211> 13

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 21

Ala Val Arg His Phe Pro Arg Ile Trp Leu His Ser Leu
 1 5 10

<210> 22
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<213> Artificial Sequence

<220>
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<400> 22

Ala Val Arg His Phe Pro Arg Pro Trp Leu His Gly Leu
1 5 10

<210> 23
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<220>
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<400> 23

Val Ser Asp Gly Gly Pro Asn Leu Tyr
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<400> 24

Cys Thr Glu Leu Lys Leu Ser Asp Tyr
1 5

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<220>
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<400> 25

Gly Leu Cys Thr Leu Val Ala Met Leu
1 5

<210> 26
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<213> Artificial Sequence

<220>

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<400> 26

Gly Ile Leu Gly Phe Val Phe Thr Leu
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<210> 27

<211> 9

<212> PRT

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<220>

<223> Control peptide.

<400> 27

Asn Leu Val Pro Met Val Ala Thr Val
1 5

<210> 28

<211> 9

<212> PRT

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<220>

<223> Control peptide.

<400> 28

Ile Leu Arg Gly Ser Val Ala His Lys
1 5

<210> 29

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<212> PRT

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<400> 29

Arg Val Arg Ala Tyr Thr Tyr Ser Lys
1 5

<210> 30

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<220>

<223> Control peptide.

<400> 30

Arg Leu Arg Ala Glu Ala Gln Val Lys
1 5

<210> 31

<211> 9

<212> PRT

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<400> 31

Ile Val Thr Asp Phe Ser Val Ile Lys
1 5

<210> 32

<211> 9

<212> PRT

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<220>

<223> Control peptide.

<400> 32

Ala Thr Ile Gly Thr Ala Met Tyr Lys
1 5

<210> 33

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Control peptide.

<400> 33

Asp Tyr Cys Asn Val Leu Asn Lys Glu Phe
1 5 10

<210> 34

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Control peptide.

<400> 34

Lys Thr Gly Gly Pro Ile Tyr Lys Arg
1 5

<210> 35
<211> 9
<212> PRT
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<220>
<223> Control peptide.

<400> 35

Arg Pro Pro Ile Phe Ile Arg Arg Leu
1 5

<210> 36
<211> 10
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<220>
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<400> 36

Thr Pro Arg Val Thr Gly Gly Gly Ala Met
1 5 10

<210> 37
<211> 9
<212> PRT
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<220>
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<400> 37

Gln Ala Lys Trp Arg Leu Gln Thr Leu
1 5

<210> 38
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<212> PRT
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<223> Control peptide.

<400> 38

Phe Leu Arg Gly Arg Ala Tyr Gly Leu
1 5

<210> 39
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<220>

<223> Control peptide.

<400> 39

Arg Ala Lys Phe Lys Gln Leu Leu
1 5

<210> 40

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<400> 40

Glu Leu Arg Ser-Arg Tyr Trp Ala Ile
1 5

<210> 41

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<220>

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<400> 41

Ser Arg Tyr Trp Ala Ile Arg Thr Arg
1 5

<210> 42

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<400> 42

Arg Arg Ile Tyr Asp Leu Ile Glu Leu
1 5

<210> 43

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<400> 43

Tyr Pro Leu His Glu Gln His Gly Met
1 5

<210> 44
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<400> 44

Glu Glu Asn Leu Leu Asp Phe Val Arg Phe
1 5 10

<210> 45
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<400> 45

Gln Glu Phe Phe Trp Asp Ala Asn Asp Ile Tyr Arg Ile Phe Ala
1 5 10 15

<210> 46
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<220>
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<400> 46

Pro Cys Asn Lys Cys Tyr Cys Lys Lys Cys Cys Tyr His Cys Gln Val
1 5 10 15

Cys Phe Ile Thr
20

<210> 47
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<212> PRT
<213> Artificial Sequence

<220>
<223> HIV-1 antigenic fragment/epitope.

<400> 47

Ala Cys Ser Lys Cys Tyr Cys Lys Lys Cys Cys Trp His Cys Gln Leu
1 5 10 15

Cys Phe Leu Lys
20

<210> 48
<211> 20
<212> PRT
<213> Artificial Sequence

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<400> 48

Pro Cys Thr Lys Cys Tyr Cys Lys Arg Cys Cys Phe His Cys Gln Trp
1 5 10 15

Cys Phe Ile Thr
20

<210> 49
<211> 20
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<220>
<223> HIV-1 antigenic fragment/epitope.

<400> 49

Ala Cys Ser Lys Cys Tyr Cys His Ile Cys Cys Trp His Cys Gln Leu
1 5 10 15

Cys Phe Leu Asn
20

<210> 50
<211> 16
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<220>
<223> HIV-1 antigenic fragment/epitope.

<400> 50

Arg Gln Arg Arg Arg Pro Pro Gln Gly Gly Gln Ala His Gln Asp Pro
1 5 10 15

<210> 51
<211> 16
<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 51

Lys	His	Arg	Arg	Gly	Thr	Pro	Gln	Ser	Ser	Lys	Asp	His	Gln	Asn	Pro
1				5					10					15	

<210> 52

<211> 16

<212> PRT

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<223> HIV-1 antigenic fragment/epitope.

<400> 52

Arg	Arg	Arg	Arg	Gly	Thr	Pro	Gln	Ser	Arg	Gln	Asp	His	Gln	Asn	Pro
1				5					10					15	

<210> 53

<211> 16

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 53

Arg	Gln	Arg	His	Arg	Thr	Pro	Gln	Ser	Ser	Gln	Ile	His	Gln	Asp	Pro
1				5					10					15	

<210> 54

<211> 21

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 54

Asn	Glu	Lys	Glu	Leu	Leu	Glu	Leu	Asp	Lys	Trp	Ala	Ser	Leu	Trp	Asn
1				5					10					15	

Trp	Phe	Ser	Ile	Thr
				20

<210> 55

<211> 21

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 55

Asn Glu Gln Glu Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn
 1 5 10 15

Trp Phe Asp Ile Ser
 20

<210> 56

<211> 21

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 56

Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Thr
 1 5 10 15

Trp Phe Ser Ile Thr
 20

<210> 57

<211> 36

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 57

Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
 1 5 10 15

Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
 20 25 30

Ala Arg Ile Leu
 35

<210> 58

<211> 15

<212> PRT

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<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 58

Tyr Ala Ala Ala Gln Trp Asp Phe Gly Asn Thr Met Cys Gln Leu
1 5 10 15

<210> 59

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 59

Cys Ser Ser His Phe Pro Tyr Ser Gln Tyr Gln Phe Trp Lys Asn Phe
1 5 10 15

Gln Thr Leu Lys
20

<210> 60

<211> 15

<212> PRT

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<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 60

Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu Pro
1 5 10 15

<210> 61

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 61

Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
1 5 10 15

<210> 62

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 62

Asp Glu Glu Leu Ile Arg Thr Val Arg Leu Ile Lys Leu Leu Tyr
1 5 10 15

<210> 63

<211> 16

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 63

Arg Arg Arg Arg Trp Arg Glu Arg Gln Arg Gln Ile His Ser Ile Ser
1 5 10 15

<210> 64

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> HIV-1 antigenic fragment/epitope.

<400> 64

His Ile Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu
1 5 10 15